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27. BIOLOGY OF *ALTICA COERULEA* (OLIV.) (CHRYSOMELIDAE: COLEOPTERA) — A POTENTIAL BIO-CONTROL AGENT AGAINST *JUSSIAEA REPENS* L.

(With two text-figures)

The present communication deals with the first report on the larvae and adults of leaf beetle, *Altica coerulea* (Oliv.) (Fig. 1a, b) (Order Coleoptera, Family Chrysomelidae, sub family Alticinae) as a potential bioagent for the control of water primrose *Jussiaea repens* L. in the water bodies of fisheries interest. Studies carried out at the Central Institute of Freshwater Aquaculture, Kausalyaganga indicate that the larvae and adults of the beetle do not attack

36-38 μ m) are laid horizontally in patches (8-11 patches) on the ventral side of the host leaves for 72 hours consecutively. The dull black 1.5-1.7 mm larva hatches out after 6-7 days of incubation and starts feeding voraciously on the tender parts of the *Jussiaea* plant. This larva grows up to 9-11 mm in 21 days, when it can consume 31-39 mg of leaves and tender stems per day (i.e. nearly 250-280% of their body weight). At dearth of fresh leaf as a result of total grazing by themselves, larvae bore into the stem wall and excavate tunnels along its length, sometimes traversing internodes, making larval galleries, where they may eventually pupate. After actively feeding for 21-24 days full-grown larvae (12-14 mg) become bowed and cease feeding for one day, then they undergo pupation. The event takes place nakedly by means of a split down the pre-abdomen and the pupa gradually works the larval skin forwards until it forms a crumpled mass at the oral extremity. The light yellow coloured pupae (9-10 mg) metamorphose into adults in about 4 days. The image is 5-6 mm long and 13-15 mg in weight. There is little difference between adult males and females, the males are comparatively small and metallic violet-black in colour, while females are metallic greenish black. Life span (at 16.0°-35.5°C) is over 57 days. Aestivation occurs in moist places under grass clumps and dry leaves on ground. The beetles migrate to nearby infested water bodies, only when the host plants become meagre. They are hardy and vigorous defoliators, making holes in leaves (consumption per day 16-24 mg/beetles). Artificial hibernation over 50 days can be imposed by keeping them at low temperature (4-5°C) in a closed moist bottle, with complete resumption to normal life when

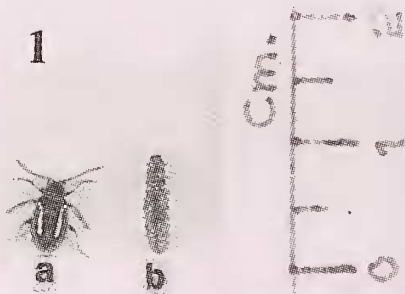


Fig. 1. a. Imaginal and b. larval form of the leaf beetle, *Altica coerulea* (Oliv.).

Fig. 2. Control of *Jussiaea* in a fish pond by leaf beetle.

any other plant of economic importance. The entire life cycle of this beetle is completed within 62-78 days in the spring (at temperature range 16.0-35.5°C). Elongated yellow eggs (Size 93-94 μ m x

normal conditions are restored, which suggests easy storage of inoculum and transport for dissemination. The fecundity of this beetle has been recorded to range between 140 and 160 (SD-3.35). Adults copulate in overlapping position and the male usually dies after mating. Females lay eggs in batches (14-23 in a batch) and males copulate at least 8-10 times in the intervals during oviposition. The imaginal form has been found most suitable for inoculation in *Jussiaea* infested ponds where they multiply efficiently and establish themselves. Beetles and their larvae start devastation from inoculation sites and gradually spread all over (Fig. 2). Their grazing verge can be demarcated apparently beyond which the gravid female lays eggs and thus facilitates dispersal. Repeated grazing by both larvae and adults lead to eradication of this weed from water bodies.

This beetle has been found throughout the year but in summer its population gradually diminishes with the increasing intensity of temperature which only adults can withstand, aestivating under suitable shelter. With the onset of rains they efficiently start propagating and become most effective during winter months, when the host plant's growth period is at the peak. Except some larvivorous fishes, so far no natural enemies have been met with during the extensive field observations.

Control of excessive growth of aquatic vegetation is a major problem. Chemical, manual and mechanical control methods can be too expensive, while biological control of weeds is not only efficient but also ecologically acceptable and economically viable. Though, insects have been used for biological control of noxious aquatic plants (Robson 1968, Chaudhuri and Janaki Ram 1975,

Jayanth and Nagarkatti 1986 and Sar 1991), no satisfactory bioagent is known to control water primrose, *Jussiaea repens* L. a marginal floating aquatic weed of freshwater ponds. The present studies reveal the potential of *Altica coerulea* beetle and its larva as a bio-control agent for water primrose, being hardy and easy to transfer to the host plant in different localities where it readily propagates.

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